

CAIV Impact on Program Management

Expect Conflict, But Don't Allow It to Corrupt Your Methodology

ANN BLEY

This article presents the means by which the Grizzly vehicle program dropped its Average Unit Procurement Cost (AUPC) from approximately \$6.75 million in FY95 constant dollars (C\$) to \$5.07 million in FY95 C\$ via the use of acquisition reform initiatives. None of these initiatives are particularly innovative if considered from a business perspective. What was new was their use collectively to manage, and the top-down emphasis placed on the use of these initiatives.

Background

To begin, AUPC is the average cost for a defense system in the production phase of the system's life cycle. To derive AUPC, the sum of system production costs across all fiscal years of production is divided by the total vehicle quantity that can be produced across all years at that production cost. Production costs include contractor and government facilitization, manufacturing, management, and fielding. In the development of system cost estimates, the life-cycle model used by cost estimators groups life-cycle costs with research and development costs under the 1.0 cost elements, procurement costs in the 2.0 cost elements, and operations and sustainment in the 3.0 cost elements. The production costs used to calculate AUPC defined in life-cycle cost estimate terms are the costs located in cost elements 2.0 to 2.10. Again, these costs include such things as initial production facilities



(cost element 2.011), manufacturing (cost element 2.021), system test and evaluation (cost element 2.05), system/project management (cost element 2.06), and fielding (cost element 2.10).

At Milestone I (MS I), the Milestone Decision Authority (MDA) judges

whether a system should enter into the Program Definition and Risk Reduction phase (formerly Advanced Development [AD] phase), and if approved for the phase, technological solutions then migrate into a system concept. At MS I, the estimate of AUPC for the Grizzly vehicle was around \$3.6 million in FY92 C\$. Three years later, and

Bley is an Army program analyst with 10 years' experience working primarily with weapons and tracked combat vehicle budgets, Tank-Automotive Command (TACOM), Warren, Mich. She currently works in the Program Executive Office, Ground Combat Support Systems. From March 1995 to March 1996, she participated in the Army Acquisition Mentoring Program as a protégé to the Deputy Assistant Secretary for Plans, Programs, and Policy. In May 1996, TACOM designated her as one of two "Cost As an Independent Variable" subject matter experts in support of Acquisition Reform Acceleration Day at the Tank-Automotive Command.

a year prior to the planned Milestone II decision, the revised, validated estimate of production costs indicated that AUPC was about \$6.5 million in FY92 C\$ (\$6.75 million in FY95 C\$). The factors that led to an almost doubling of AUPC were: underestimated and new technical requirements, limited historic data upon which to base the original cost estimate, and pressures from management during the

same as those that caused the production cost increase; moreover, the RDT&E cost increase was the result of a planned RDT&E phase which, in execution, was too short to support system design maturation requirements.

Enter Acquisition Reform

About the same time that the cost estimators calculated the \$6.7-million

technical. Although important, cost objectives came in a lagging third.

With the advent of acquisition reform, the prioritization of objectives now appears reversed. The new management direction appears to make cost its No. 1 priority, closely followed by technical. This was especially my impression when my Program Manager (PM) communicated the increase in AUPC to the PEO.

The PEO response to the PMO projected increase to AUPC was that the increase to the estimate of AUPC from Milestone I was unaffordable: much lower program costs would have to be developed as the basis for the upcoming Program Objective Memorandum budget submission. The PEO direction to the PMO was to bring down unit procurement cost; to accomplish a lowered procurement cost, the PMO was to work with the contractor and the combat developer to identify program savings through the use of acquisition reform initiatives. Understandably, the PEO wanted assurance of the validity of program cost savings achieved, and cautioned the PMO that any decrease to AUPC had to be one that the contractor was willing to “buy into.” That is, the contractor had to agree that the production contract cost of the target AUPC would be the actual contract cost when the system went into production.

Identification of Cost Drivers and Opportunities For Savings

After the PEO communicated that program costs must be lowered, the PMO began to develop a process to lower program AUPC. The first step was analysis at the action-officer level to identify program cost drivers, and opportunities for cost savings. Since this was to be a joint government/contractor effort, as part of this analysis government and contractor cost personnel met to determine if the contractor's estimates for manufacturing costs reconciled with government estimates. If government costs for manufacturing did not reconcile with the contractor, we needed to know why, and to devel-



Before the implementation of acquisition reform initiatives, the priority assigned to cost, schedule, and technical program objectives placed primary emphasis on the accomplishment of program schedule, closely followed by technical. Although important, cost objectives came in a lagging third.

development of the original estimate to assume that lower projections for estimated program cost were the most likely.

In addition to the increase in production costs, Research, Development, Test, and Evaluation (RDT&E) costs also came in at an increased cost—roughly \$254.6 million in FY92 C\$ (\$271.0 million in FY95 C\$), from an MS I total of approximately \$84.6 million in FY92 C\$. The reasons for the increase in the RDT&E cost were the

AUPC, the concept of acquisition reform started to filter down to Program Executive Office (PEO)/Program Management Office (PMO) levels. Acquisition reform in my PMO had a significant impact.

Before the implementation of acquisition reform initiatives, the priority assigned to cost, schedule, and technical program objectives placed primary emphasis on the accomplishment of program schedule, closely followed by

op adjustments to government and/or contractor cost models that resulted in estimates that basically projected the same program costs.

This was not the easiest task to accomplish, but was much easier than I originally would guess. A prototype vehicle fabricated by the contractor during the Program Definition and Risk Reduction (formerly AD) phase provided real-world costs from which to derive future production costs. Both the contractor and the government cost estimators used the prototype fabrication cost as the basis for their estimates of system production cost in the vehicle production phase of the system life cycle. Reconciliation became a matter of understanding the breakdown of government versus contractor estimates of manufacturing and other contractor costs.

The follow-on action to complete the first step in the process—the identification of cost drivers and opportunities for savings—was developed as a sort of laundry list for further review and analysis at a future time. (It is interesting to note that the action officers involved in the identification effort had certain cost drivers that they already felt should be targeted prior to the analysis. Perhaps they were thinking, “Here is the opportunity to cut out some of the fat in the program.” It almost seemed as if they had been waiting for an opportunity such as this.)

With the completion of the first step in the process to lower program costs, the PM, at the direction of the PEO, called a meeting between government and contractor upper management levels. In attendance were the PEO, the contractor Chief Executive Officer, and the Commandant of the Training and Doctrine Command school assigned as the combat developer for the system. At the meeting, the PM presented the analysis of cost drivers, specifically identifying those cost drivers with high savings potential. The PM asked top management for a decision in response to the question: “To reduce costs, which cost drivers should

receive the most emphasis?” In addition, the PM asked for approval to give action officers the flexibility to decrease program costs via changes in design and technical solutions, and in some cases, to bring up for discussion a reconsideration of the combat developer’s originally identified requirements. Top management at this meeting took the initiative and identified the cost drivers for the PMO to focus on, and specified, as had been requested, the scope of further analysis.

Further, top management extended the direction of further analysis by setting what at the time seemed to be impossible cost objectives for total RDT&E and production costs. The first objective required a 20-percent decrease to the RDT&E costs from what was the estimated total cost for the Engineering and Manufacturing Development (EMD) phase (RDT&E after the Milestone II decision). The second objective was to decrease AUPC from \$6.75 million FY95C\$ to \$5.0 million FY95C\$, which translated to an approximate 35-percent decrease in the estimated cost for the vehicle production phase.

After this meeting, the process was again down at action-officer level. From the management-approved cost drivers we were to focus on, the contractor personnel developed program changes with estimates of cost reductions if they, in fact, implemented these changes. As indicated earlier, these proposed changes addressed changes to system design, technical solutions, or combat developer-identified requirements. The PM called an action officer meeting, with personnel from the contractor, the PMO, PMO matrix support offices, and from the combat developer school. At this meeting, we either accepted, deferred, or declined contractor-developed proposals.

- Accepted proposals were those the PM and the combat developer felt were in accordance with top management’s direction on the specific cost drivers.

- Deferred proposals required further analysis before these could be accepted or declined.
- Declined proposals, for various reasons, were not to be further considered as means to reduce program costs. In the case of declined proposals, the government believed the proposed changes would degrade system performance or they were out of the range of what the combat developer could live with in terms of requirement adjustments.

Follow-on activity after this action-officer meeting began with further refinement of cost impacts of the accepted and deferred proposals. Contract personnel developed initial cost impacts for the accepted and deferred proposals. Government personnel then reviewed the proposals to determine the validity of estimated cost savings, and in addition, which cost savings proposals to include in program cost models.

We did not incorporate all of the accepted proposals into the cost models. Part of the problem was that these either were too small to make a substantive change to program costs, or data available on cost savings were not adequate to provide costs that could be validated during the cost estimating process. An example of an accepted proposal, which was not included in the government’s cost model, was the contractor’s proposal to standardize quality assurance activities across all government contracts. This was in line with the spirit of acquisition reform; government personnel accepted almost all of the specific standardization actions proposed by the contractor. Unfortunately, in most cases the quality initiatives seemed to generate only small per-vehicle savings (as an example \$100/vehicle), or could not be sufficiently quantified to develop valid cost savings. As a result, government personnel did not believe it was reasonable to include these in the cost models, even when these smaller cost proposals were accepted for implementation.

In the case of cost savings proposals with low per-vehicle savings, these did not generate sufficient program savings to justify activity to accurately identify savings achieved, to make legitimate adjustments to the model, and to maintain an audit trail of the savings from the accepted proposal. The PMO decided to incorporate only those accepted proposals that were major cost savers. To date, this seems like a smart decision since keeping track of the impact of the proposals incorporated in the cost model on program costs has been relatively manageable. The PM organization structure provides insufficient resources to manage cost savings proposals with a marginal return: if 40 percent of the cost savers generate 80 percent of the savings, it would not be cost effective to build the other 60 percent of the cost savers into the model. This was our rationale in the migration of the cost savers into the program cost models.

The result of the review of the contractor's accepted and deferred savings proposals was that the government made final decisions about what cost savers to include in the budget laydown. We added all of the accepted and two deferred proposals with a high probability of acceptance into program automated cost models, which are used to develop program RDT&E and production costs, and which would be the basis for budget submissions. These plus program cost decreases from a proposed multi-year procurement contracting strategy generated sufficient savings ultimately to accomplish the objective for AUPC set by top management. This was the "do or die" objective.

The second cost objective for RDT&E cost savings was not met; at the final briefing to the PEO, the projected cost savings came in at a 3-percent decrease. The good news though, was that in spite of the trade-off required between design cost and AUPC in accomplishing the AUPC objective, program RDT&E costs decreased.

Lessons Learned

Let me conclude this article with a discussion of the lessons learned that I view as most important in using acquisition reform to lower program costs. Overall, I think these are good rules of thumb for any PMO faced with similar pressures to lower program costs. These are my opinions; however, I believe, based upon my experience with the implementation of the Cost As an Independent Variable (CAIV) acquisition reform initiative, that these are valid conclusions:

First, Get the Green Light From Top Management.

In order for the concept of CAIV to work effectively, the decision to implement the concept and the definition of the scope of the effort in lowering costs must be a top-down-type management activity. Many of the savings initiatives incorporated in our final program laydown were the subject of discussion at action-officer levels prior to the initiation of a formal action by the PEO. What was missing in the past was the go ahead from top management to further define these and then implement the initiatives. I must emphasize that the implementation of the initiatives would have been *impossible* without management approval. The scope of the initiatives impacted key requirements of the combat developer, the materiel developer, and the prime contractor, and required their approval before the PM could take action.

Acquisition Reform and Program Savings Expectations.

Standard acquisition reform-type activity may not necessarily result in big program savings. For our program, changing the contract quality standards had a minimal impact on overall program costs. At least for cost estimating purposes, we were unable to document substantial savings.

Cost Savings: Production Phase vs. RDT&E Phase.

If the objective is to achieve cost savings in the production phase, savings in the RDT&E phase may not also be possible. In the case of my assigned program, each contrac-

tor-proposed AUPC savings was also estimated by the contractor to result in an increased cost in RDT&E work to support the production savings. The initial briefing back to the PEO presented some savings in RDT&E costs, but these were not even close to the original objective set by management.

Cost Savings Actions: Periodic Review vs. Ongoing Activity.

If the objective is to achieve high cost savings in a single action, then periodic program scrubs will accomplish this. Since programs seem to add requirements and costs as a life-cycle stage progresses, I would think that the most likely opportunity to find substantial savings would be just prior to the next upcoming milestone review. By "just prior," I mean about a year and a half prior to the review; this will allow adequate time to develop validated Program Office Cost Estimates (POE), which are requisite as part of the milestone documentation.

If the objective is to ensure that looking for cost savings opportunities becomes a part of the PMO way of doing business, then ongoing review of program costs via the Integrated Product Team (IPT) concept will accomplish this. As a way to ensure that costs will not escalate and to seize any opportunities for genuine savings, my PMO chose the latter course of action. Toward that end, as part of our EMD contract, we established a Cost Reduction IPT, including the contractor, PMO, and combat developer action officers.

Find The Right Software and Automate.

To expedite the development of cost estimates, it is important to get simple and easy-to-work-with software tools. The automated tools should have the capability to incorporate data and output program laydowns very quickly. For the Grizzly study, we developed RDT&E and production spreadsheets using *Microsoft Excel* software that broke down costs by cost elements; as reductions were made to cost elements, these could easily be incorporated into the model. The

production cost model further broke down production costs into hardware components, again allowing for easy incorporation of reductions to component costs. In addition, the production model had the capability to provide an automatic estimate of cost when changes to annualized production quantities were made.

Find the Right People. One very important ingredient in our process to accomplish the AUPC savings objective was our action-officer mix. Who have you got to make this happen? Minimally, you need a competent cost analysis, and engineering staff. The cost function must be very familiar with the cost make-up of the program. The engineering function must be skilled in reviewing what the contractor proposes and “weeding out the smoke and mirrors” in what the contractor proposes as candidates for cost savings.

Minimize “Creative Money Management” Techniques. Speaking of “smoke and mirrors,” don’t allow this to become your guiding principle in doing the analysis. At one point in our study, a suggestion surfaced that we

just do across-the-board percentage cuts to the cost cells to accomplish the cost objective. As an action officer responsible for study procedure, I argued strongly against this idea. At the time I believed it was too early to make any assumptions for savings without a clearly defined means to accomplish these savings. My suggestion was to let the study take its course, and see what the projected savings would be using only decreases to cost, based upon valid cost savings proposals.

Ultimately, we managed to achieve the cost objective with a minimum, if any, of what could be called “creative money management” techniques. As a result, the cost estimate used to accomplish the program cost objective was the basis for our validated POE. To date, the POE has withstood independent cost estimator’s review. *Expect conflicts, but again, don’t allow these to corrupt your methodology.*”

Identify Where You Want to Achieve Cost Savings. Finally, based upon my experience and what I know of other PMOs involved in similar efforts, if the objective is to achieve savings in the

production and operations phases of a system, the time to be laying the groundwork is in the RDT&E phase. The Program Definition and Risk Reduction phase or before is preferred to the EMD phase or after.

If you’re trying to achieve savings in the production phase, I believe you just might find yourself scraping the bottom of the barrel looking for savings opportunities. It can be done, but it seems that since system design is mature, opportunities for major changes to system requirements/design are much fewer than in earlier program phases and therefore, real high-dollar opportunities to lower costs are fewer. In order to accomplish cost savings goals in the production phase, it may be necessary to increase the quantity of planned savings initiatives since the savings initiatives might not have the high-dollar values as would be possible in earlier program phases. As a result, you may end up with an unmanageable number of cost savings initiatives, which ultimately you will have to execute in order to accomplish your savings objectives.



A RMY BRIG. GEN. RICHARD A. BLACK, DSMC COMMANDANT, CONFERS WITH DONNA RICHBOURG, ASSISTANT DEPUTY UNDER SECRETARY OF DEFENSE FOR SYSTEMS ACQUISITION, AND ACTING DEPUTY UNDER SECRETARY OF DEFENSE FOR ACQUISITION REFORM. RICHBOURG ASSUMED THE POSITION OF ACTING DEPUTY UNDER SECRETARY EFFECTIVE JANUARY 18, 1997.